National Institute of Standards & Technology

Certificate of Analysis

Standard Reference Material® 1473b

Low Density Polyethylene Resin

This Standard Reference Material (SRM) is intended for use in calibration and performance evaluation of instruments used in polymer technology and science for the determination of the Melt Flow Rate using ASTM D 1238-00. The SRM is supplied as white pellets of polyethylene.

Certified Values and Uncertainties: This material is certified for melt flow rate using ASTM D 1238-00, Test Method for Flow Rates of Thermoplastics by Extrusion Plastometer [1] Standard Test Condition 190/2.16. The flow rate of the melt was determined at 190.0 °C ± 0.1 °C and a load of 2.16 kg by procedure A of the ASTM method. A manually operated extrusion plastometer was used. Under these conditions [2], the certified melt flow rate for this material is as follows:

Melt Flow Rate (FR) = 1.13 g/10 min ± 0.098 g/10 min

The uncertainty is the numerical value of an expanded uncertainty $U = ku_c$, with U determined from a combined standard uncertainty, u_c, and coverage factor, $k = 2$, [3] at a level of confidence of 95 %. Type A and Type B contributions to the expanded uncertainty include the standard deviation of the melt flow measurement, instrument–to–instrument variation as discussed in ASTM D 1238-00, operator dependence of the measurement, and temperature gradients in the apparatus [2]. The standard deviation for an average single measurement is 0.013 g/10 min, with 47 degrees of freedom [2].

Expiration of Certification: The certification of SRM 1473b is valid until **01 January 2008**, within the measurement uncertainties specified, provided that the SRM is handled in accordance with the storage instructions given in this certificate. This certification is nullified if the SRM is modified or contaminated.

Maintenance of SRM Certification: NIST will monitor this SRM over the period of its certification. If substantive technical changes occur that affect the certification before expiration of this certificate, NIST will notify the purchaser. Return of the attached registration card will facilitate notification.

Storage: The SRM should be stored in the original bottle with the lid tightly closed and under normal laboratory conditions.

Homogeneity: The homogeneity of SRM 1473b was tested by melt flow measurements using ASTM D 1238-00. The characterization of this polymer is described in Reference 2.

The technical coordination leading to certification of this SRM was provided by B.M. Fanconi of the NIST Polymers Division. The technical measurement and data interpretation were provided by C.M. Guttman, J.R. Maurey, C.R. Schultheisz, and W.R. Blair of the NIST Polymers Division.

Statistical analysis was provided by S.D. Leigh of the NIST Statistical Engineering Division.

The support aspects involved in the preparation, certification, and issuance of this SRM were coordinated through the NIST Standard Reference Materials Group by J.W.L. Thomas.

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Certificate Issue Date: 11 July 2002

John Rumble, Jr., Chief
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REFERENCES

[1] ASTM D 1238-00; *Test Method for Melt Flow Rates of Thermoplastics by Extrusion Plastometer*; ASTM Standards, Vol. 08.01, American Society for Testing and Materials, West Conshohocken, PA (2001).

[2] Maurey, J.R.; Schultheisz, C.; Blair, W.R.; Guttman, C.M.; *Certification of Standard Reference Material 1473b, A Polyethylene Resin*; NIST Special Publication Number SP 260-144.

[3] *Guide to the Expression of Uncertainty in Measurement*; ISBN 92-67-10188-9, 1st Ed., ISO, Geneva, Switzerland, (1993); see also Taylor, B.N.; Kuyatt, C.E.; *Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Results*; NIST Technical Note 1297, U.S. Government Printing Office; Washington, DC (1994); available at http://physics.nist.gov/Pubs/.

[4] Taylor, B.N.; *Guide for the Use of the International System of Units (SI)*; NIST Special Publication 811; Ed. (April 1995).

Users of this SRM should ensure that the certificate in their possession is current. This can be accomplished by contacting the SRM Program at: telephone (301) 975-6776; fax (301) 926-4751; e-mail srminfo@nist.gov; or via the Internet http://www.nist.gov/srm.